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Emerging Infectious Diseases

Escherichia coli O157:H7 Outbreak Linked to Home-Cooked Hamburger — California, July 1993

Although outbreaks of *Escherichia coli* O157:H7 have been linked to consumption of contaminated ground beef, the organism is rarely isolated from the implicated meat. In addition, most epidemiologic investigations of illness associated with *E. coli* O157:H7 infections have been directed at restaurant-associated outbreaks, and the sources of infection for sporadic cases rarely have been identified. In July 1993, three cases of culture-confirmed *E. coli* O157:H7 infection among persons residing in a small community in California were traced to consumption of hamburger purchased from a local grocery store; *E. coli* O157:H7 was isolated from that meat. This report summarizes the investigation of these cases by local and state public health officials.

On July 12, 1993, a hospital laboratory in Fort Bragg, California, reported a case of *E. coli* O157:H7 infection in a 13-year-old girl to the Mendocino County Public Health Department (MCPHD). The patient had had onset of bloody diarrhea on July 7 and recovered. Members of her family reported having eaten home-cooked hamburgers on July 5 made from meat purchased from a local market (market A) on July 3; the hamburgers had been cooked "medium rare." All five family members who ate the hamburgers reported diarrhea; the index patient and her mother had bloody diarrhea. *E. coli* O157:H7 was isolated from leftover ground beef from the same package used to make the hamburgers.

Two additional cases of culture-confirmed *E. coli* O157:H7 infection occurred in persons residing in the same community: an 18-year-old man who had onset of bloody diarrhea on July 18 and an 84-year-old woman with diabetes mellitus and chronic uremia who developed nonbloody diarrhea on July 10. Both persons reported having eaten hamburger purchased at market A on July 3. Two family members of the man and one family member of the woman also developed nonbloody diarrhea after eating the hamburger. Although no patients developed hemolytic uremic syndrome (HUS), the elderly woman died 3 weeks after hospitalization; her death was attributed to her chronic renal disease.

Media announcements from MCPHD requested persons who had experienced bloody diarrhea during July to contact the department. Of five persons who reported

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having had bloody diarrhea, four submitted stool for culture. Although all were negative, the cultures had been obtained 11–26 days after onset of diarrhea. Reviews of the emergency department log of the district hospital for July 1–22 did not identify additional cases of bloody diarrhea.

Environmental health staff from MCPHD and staff from the U.S. Department of Agriculture (USDA) inspected market A and the other two markets in the community that sold ground meat (markets B and C) but did not identify violations in meat storage or grinding procedures. Shelf samples of ground beef from all three markets were obtained for testing. The owner of market A also initiated a voluntary recall of all ground beef purchased at that market during June 25–July 19; as a result, 91 packages of ground beef were returned.

Of the 15 samples of ground beef obtained from market A and tested, four were positive for *E. coli* O157:H7. All positive samples had been placed on the shelves on July 3. Of 16 samples from market B, one was positive for *E. coli* O157:H7. None of seven samples obtained from market C were positive. The packages placed on the shelf of market A on July 3 were obtained from "chubs," which are large tubes of ground beef purchased from an outside supplier. The market often reground the meat in its own grinder and sometimes added "trim meat" from other sources. A traceback of the meat was not performed.

Because the isolates produced an uninterpretable pattern by pulsed-field gel electrophoresis, selected isolates were further characterized by phage typing at the National Laboratory for Enteric Pathogens, Laboratory Center for Disease Control, in Ottawa. Phage type 31 was identified in the three patient isolates, the leftover ground beef obtained from the freezer of the index patient's family, and the two isolates selected for testing from market A. The sample from market B (which was not implicated in the outbreak) was phage type 4.

Following the investigation, MCPHD provided information to all county meat markets about optimal meat-grinding procedures and issued a press release advising consumers to cook ground beef thoroughly.

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Editorial Note: *E. coli* O157:H7 was first described as a pathogen in humans in 1982 following the investigation of two outbreaks of illness that were associated with consumption of hamburger from a fast-food restaurant chain (*1*). Since then, more than 12 outbreaks have been reported in the United States (*2*). Although other investigations have implicated consumption of undercooked ground beef, less commonly identified sources of *E. coli* O157:H7 infection have included roast beef, unpasteurized milk, apple cider, and municipal water (*2,3*). Person-to-person transmission in child day care centers also has been documented (*4*).

E. coli O157:H7 infection causes diarrhea (often bloody) and abdominal cramps; fever is infrequent. Infection with *E. coli* O157:H7 is a relatively common cause of sporadic diarrheal illness: in prospective studies of patients with diarrhea, *E. coli*

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O157:H7 has been isolated more frequently than *Shigella* (*2*). Children and the elderly are at highest risk for clinical manifestations and complications. Although illness usually resolves within 1 week, 5%–10% of patients develop HUS, which is characterized by hemolytic anemia, thrombocytopenia, and renal failure. HUS is a common cause of acute renal failure in children, and the case-fatality rate is 3%–5%.

Sporadic cases and small outbreaks of *E. coli* O157:H7 infection similar to the cluster described in this report probably occur throughout the United States but are not recognized. Many clinical health-care providers do not routinely order stool cultures for patients with diarrhea. Even when stool cultures are ordered, clinicians may not be aware that most laboratories do not culture stools for *E. coli* O157:H7 using sorbitol-MacConkey medium unless specifically requested (*5*).

The findings in this report illustrate the usefulness of subtyping in distinguishing outbreak strains of *E. coli* O157:H7 from those present in the community but unassociated with an outbreak. There are at least 62 known phage types of *E. coli* O157:H7. In Canada, where phage typing is the predominant subtyping method used, phage type 31 accounts for 9% of isolates tested (*6*).

E. coli O157:H7 may be present in the intestines of healthy cattle and may contaminate meat during slaughter. The process of grinding beef may then transfer pathogens from the surface of the meat to the interior.

Because of the publicity generated by large restaurant-associated outbreaks, many persons associate infections caused by *E. coli* O157:H7 with restaurant-served ground beef. However, the outbreak in Mendocino County emphasizes that home-cooked hamburgers can be a source of infection and underscores the need to cook ground beef until the interior is no longer pink and juices run clear; thorough cooking kills *E. coli* O157:H7. On March 28, 1994, the USDA Food Safety and Inspection Service published regulations mandating that safe handling instructions be included on all raw meat and poultry product labeling.* These regulations include instructions to cook meat thoroughly.

In June 1993, the Council of State and Territorial Epidemiologists (CSTE) passed a resolution that reporting of *E. coli* O157:H7 infections should be required in all states. As of October 1, 1993, however, only 17 states required *E. coli* O157:H7 infection to be reported to state health departments (G.S. Birkhead, M.D., CSTE, personal communication, 1994). CDC is working with state health departments to establish national surveillance for *E. coli* O157:H7 infections. National surveillance and increased laboratory testing for *E. coli* O157:H7 will assist in defining the public health impact of this emerging pathogen.

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Emerging Infectious Diseases

Prevalence of Penicillin-Resistant *Streptococcus pneumoniae* — Connecticut, 1992–1993

Streptococcus pneumoniae is an important cause of community-acquired bacterial pneumonia, meningitis, acute otitis media, and other infections (*1*). Infants, young children, and the elderly are most severely affected by pneumococcal disease (*2*). Although *S. pneumoniae* was once considered to be routinely susceptible to penicillin, since the mid-1980s the incidence of resistance of this organism to penicillin and other antimicrobial agents has been increasing in the United States (*1–4*). National surveillance for drug-resistant *S. pneumoniae* (DRSP) is limited to testing invasive isolates from sentinel hospitals in 13 states. To determine the extent of antimicrobial susceptibility testing of *S. pneumoniae* and the prevalence of penicillin resistance among pneumococcal isolates from July 1992 through June 1993, in August 1993 the Connecticut Department of Public Health and Addiction Services (DPHAS) surveyed all 44 hospitals with clinical microbiology laboratories in Connecticut. This report summarizes the results of that survey.

Hospital laboratories were asked whether pneumococcal isolates were tested for resistance to penicillin, which isolates were tested, which tests were used, the number of isolates tested from different body sites from July 1992 through June 1993, and the minimal inhibitory concentrations (MICs) for any resistant isolates. Forty-three (98%) of 44 hospital laboratories responded.

Of the 43 hospital laboratories, 33 reported performing antimicrobial susceptibility tests on pneumococcal isolates, nine sent pneumococcal isolates to other laboratories for testing, and one neither performed such tests on pneumococcal isolates nor sent isolates to other laboratories for testing.

In 15 of the 33 laboratories, penicillin susceptibility testing was limited to qualitative disk diffusion (using an oxacillin disk). Nine laboratories screened pneumococcal isolates by disk diffusion, then confirmed penicillin resistance by determination of a quantitative MIC. Nine laboratories determined the penicillin MIC for all pneumococcal isolates.

MIC data were provided by 14 of the 18 laboratories that performed such tests for pneumococcal isolates. MICs were reported for 846 isolates collected during July 1992–June 1993. Penicillin resistance was defined as MIC ≥0.1 µg/mL, and high-level resistance was defined as MIC ≥2.0 µg/mL (*5*). Penicillin-resistant isolates were reported from four of 14 hospitals. Eighteen isolates (2.1%) from any body site were penicillin resistant, including five (1.3%) of 400 isolates from usually sterile sites.

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Overall, three isolates (one each from blood, sputum, and nasal fluid) were highly resistant. Two of these isolates had penicillin MICs ≥4.0 µg/mL.

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Editorial Note: The spread of DRSP strains may increase the public health impact of *S. pneumoniae* infections because of increased morbidity and reductions in the effectiveness of antimicrobial treatment for pneumococcal disease. Of special concern is resistance to extended-spectrum cephalosporins, which are often used as empiric therapy for meningitis (*3*).

During 1979–1987, only one (0.02%) of 4585 pneumococcal sterile-site isolates submitted to CDC's sentinel hospital surveillance system were highly resistant to penicillin; in comparison, during 1992, seven (1.3%) of 544 such isolates were highly resistant (*4,6*). In some pediatric populations, up to 30% of pneumococcal isolates are penicillin resistant at some level, with a substantial proportion of strains resistant to multiple drugs (*3*). Although information regarding resistance to other antimicrobial drugs was unavailable in the Connecticut survey, the overall prevalence of penicillin-resistant strains in Connecticut was low through June 1993. However, resistant pneumococcal strains can spread rapidly in communities (*7,8*), and DPHAS is conducting surveillance for antimicrobial resistance.

Because penicillin susceptibility cannot be assumed, pneumococcal isolates associated with disease should be screened routinely for penicillin resistance by disk diffusion using a 1-µg oxacillin disk (*9*), which is highly sensitive—although not 100% specific—for penicillin resistance. Screening cannot reliably quantify the degree of penicillin resistance; therefore, pneumococcal isolates with oxacillin zone sizes ≤19 mm should be further tested by determination of MICs for penicillin (*9*), as well as for other drugs likely to be used in treatment. Some pneumococci with either intermediate or high-level penicillin resistance also may be resistant to extended-spectrum cephalosporins; therefore, penicillin-resistant isolates should be tested by MIC for susceptibility to either ceftriaxone or cefotaxime (*3,5*).

To optimize empiric regimens and initial therapy for pneumococcal infections, clinical health-care providers must be informed about the prevalence and patterns of drug resistance among isolates in their communities. Statewide surveillance for DRSP as a notifiable condition has been initiated in Colorado, Connecticut, and New Jersey. CDC, in collaboration with the Council of State and Territorial Epidemiologists and the Association of State and Territorial Public Health Laboratory Directors, is developing strategies for collecting information on pneumococcal drug resistance in other states and for preventing morbidity and death associated with infection with resistant strains (*3*). Because antimicrobial susceptibility testing should be conducted routinely on invasive pneumococcal isolates, emphasis must be placed on developing methods to compile and analyze results, alerting health-care providers in communities in which resistant pneumococcal strains are prevalent, and identifying areas requiring more intensive epidemiologic assessment.

In areas where pneumococci resistant to extended-spectrum cephalosporins are prevalent, empiric therapy with vancomycin and an extended-spectrum

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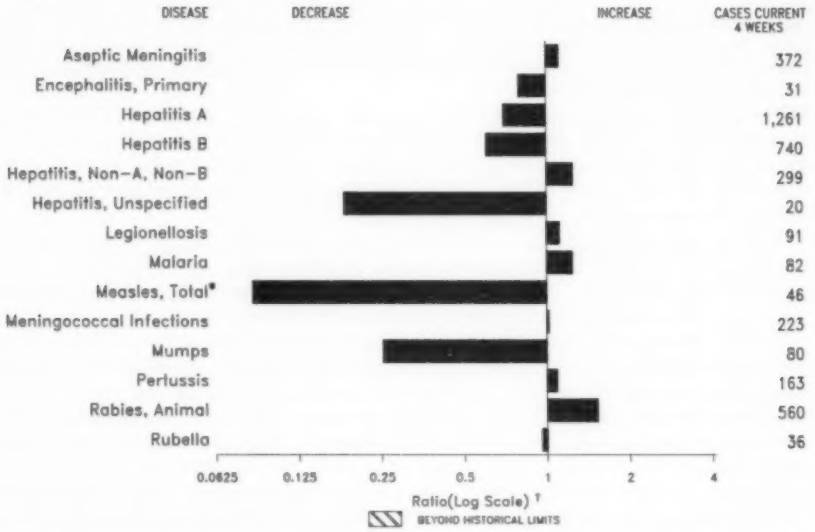
FIGURE I. Notifiable disease reports, comparison of 4-week totals ending March 26, 1994, with historical data — United States



*The large apparent decrease in reported cases of measles (total) reflects dramatic fluctuations in the historical baseline.

† Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending March 26, 1994 (12th Week)

	Cum. 1994		Cum. 1994
AIDS*	10,389	Measles: imported	7
Anthrax	-	indigenous	84
Botulism: Foodborne	7	Plague	-
infant	14	Poliomyelitis, Paralytic§	-
Other	4	Psittacosis	6
Brucellosis	9	Rabies, human	-
Cholera	1	Syphilis, primary & secondary	4,338
Congenital rubella syndrome	3	Syphilis, congenital, age < 1 year	-
Diphtheria	-	Tetanus	5
Encephalitis, post-infectious	22	Toxic shock syndrome	49
Gonorrhea	77,971	Trichinosis	22
Haemophilus influenzae (invasive disease)†	259	Tuberculosis	3,426
Hansen Disease	20	Tularemia	2
Leptospirosis	6	Typhoid fever	62
Lyme Disease	594	Typhus fever, tickborne (RMSF)	22

*Updated monthly; last update February 22, 1994.
†Of 244 cases of known age, 77 (32%) were reported among children less than 5 years of age.
§No cases of suspected poliomyelitis have been reported in 1994; 3 cases of suspected poliomyelitis have been reported in 1993; 4 of the 5 suspected cases with onset in 1992 were confirmed; the confirmed cases were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending March 26, 1994, and March 27, 1993 (12th Week)

Reporting Area	AIDS*	Aseptic Meningitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionellosis	Lyme Disease
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1993	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994
UNITED STATES	10,369	1,035	121	22	77,971	89,722	4,124	2,392	997	79	304	594
NEW ENGLAND	483	44	5	1	1,856	1,935	69	98	31	12	12	81
Maine	21	4	1	-	14	24	9	2	-	-	-	-
N.H.	18	1	-	1	-	16	2	4	5	-	-	3
Vt.	6	3	-	-	6	11	-	-	-	-	-	1
Mass.	246	16	3	-	702	723	33	90	19	12	9	43
R.I.	66	20	1	-	98	99	12	2	7	-	3	15
Conn.	126	-	-	-	1,036	1,062	13	-	-	-	-	19
MID. ATLANTIC	3,752	80	12	6	7,546	9,417	187	205	125	2	34	373
Upstate N.Y.	167	38	6	1	2,021	1,629	85	89	65	-	11	219
N.Y. City	2,881	1	-	-	1,980	3,355	4	5	-	-	-	-
N.J.	451	-	-	-	1,155	1,447	65	72	50	-	6	56
Pa.	253	41	6	5	2,390	2,986	33	39	10	2	17	98
E.N. CENTRAL	785	199	39	7	14,528	18,469	386	232	63	2	91	7
Ohio	137	55	15	-	5,767	5,821	135	50	2	-	51	7
Ind.	41	48	2	-	1,954	1,842	86	46	2	-	13	-
Ill.	490	21	7	1	2,544	5,719	73	20	1	1	4	-
Mich.	102	72	15	6	3,902	3,568	64	88	56	1	19	-
Wis.	15	3	-	-	361	1,519	28	28	2	-	4	-
W.N. CENTRAL	132	69	5	1	4,211	4,923	191	113	50	2	41	7
Minn.	27	3	1	-	810	652	34	10	1	-	-	4
Iowa	13	27	-	-	328	435	7	8	2	1	16	1
Mo.	36	15	-	-	2,245	2,724	108	82	45	1	17	-
N. Dak.	1	1	1	-	-	13	1	-	-	-	-	-
S. Dak.	3	-	1	-	28	39	9	-	-	-	-	-
Nebr.	12	1	1	1	-	169	20	2	-	-	7	-
Kans.	40	22	1	-	800	891	12	11	2	-	1	2
S. ATLANTIC	2,213	267	18	5	24,080	23,720	293	636	267	10	62	101
Del.	35	1	-	-	401	319	4	11	19	-	1	40
Md.	163	39	4	-	4,262	3,922	37	75	11	3	17	13
D.C.	166	6	-	-	1,964	1,347	8	13	-	-	-	-
Va.	94	37	8	1	3,223	1,511	34	26	13	1	2	11
W. Va.	4	5	-	-	171	156	3	6	8	-	1	3
N.C.	187	45	6	-	5,968	5,523	25	78	17	-	6	17
S.C.	90	5	-	-	2,961	2,166	7	11	-	-	1	-
Ga.	291	9	-	-	-	3,320	33	291	152	-	21	16
Fla.	1,183	120	-	4	5,130	5,456	142	125	47	6	13	1
E.S. CENTRAL	177	73	10	1	9,941	8,760	108	273	196	1	16	3
Ky.	44	30	4	1	1,055	1,104	50	12	4	-	1	1
Tenn.	53	20	5	-	2,863	1,973	31	243	190	1	9	1
Ala.	50	18	1	-	3,660	3,388	13	18	2	-	4	1
Miss.	30	5	-	-	2,363	2,295	14	-	-	-	2	-
W.S. CENTRAL	1,255	54	5	-	9,047	11,242	604	247	72	16	8	4
Ark.	23	4	-	-	1,745	2,092	8	5	1	-	1	-
La.	122	1	1	-	3,205	2,452	16	27	17	-	-	-
Okla.	19	-	-	-	494	718	52	80	45	-	7	4
Tex.	1,091	49	4	-	3,603	5,980	526	135	9	16	-	-
MOUNTAIN	184	23	2	-	1,758	2,688	747	110	75	5	21	4
Mont.	4	-	-	-	28	13	8	6	-	-	9	-
Idaho	1	1	-	-	16	26	81	20	31	1	-	1
Wyo.	-	-	-	-	25	18	5	5	18	-	1	-
Colo.	62	6	-	-	539	928	36	4	6	2	1	-
N. Mex.	21	4	-	-	238	275	244	44	5	2	1	3
Ariz.	45	6	-	-	351	887	226	14	4	-	1	-
Utah	11	2	-	-	78	72	104	7	7	-	-	-
Nev.	40	4	2	-	483	469	43	10	4	-	8	-
PACIFIC	1,388	226	25	1	5,004	8,568	1,539	478	118	29	19	14
Wash.	157	-	-	-	734	913	85	21	19	-	5	-
Oreg.	63	-	-	-	263	350	84	12	2	1	-	-
Calif.	1,111	183	24	-	3,838	7,086	1,301	424	93	26	13	14
Alaska	8	4	1	-	190	120	58	4	-	-	-	-
Hawaii	49	39	-	1	179	99	11	17	4	2	1	-
Guam	-	-	-	-	19	23	-	-	-	-	-	-
P.R.	209	4	-	-	117	110	8	56	13	2	-	-
V.I.	5	-	-	-	8	20	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	7	7	2	-	-	-	-	-
C.N.M.I.	1	-	-	-	14	15	1	-	-	-	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of Northern Mariana Islands
*Updated monthly; last update February 22, 1994.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending March 26, 1994, and March 27, 1993 (12th Week)

Reporting Area	Malaria	Measles (Rubeola)					Meningococcal infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1994	1994	Cum. 1994	1994	Cum. 1993	Cum. 1993	Cum. 1994	1994	Cum. 1994	1994	Cum. 1994	Cum. 1993	1994	Cum. 1994	Cum. 1993
UNITED STATES	215	24	84	1	7	79	774	20	270	28	718	706	21	82	46
NEW ENGLAND	24	1	5	-	-	43	48	-	8	3	57	185	14	57	1
Maine	1	-	-	-	-	-	6	-	3	-	2	3	-	-	1
N.H.	3	-	-	-	-	-	1	-	2	1	18	88	-	-	-
Vt.	1	-	-	-	-	24	1	-	-	-	7	28	-	-	-
Mass.	7	1	2	-	-	10	20	-	-	2	24	58	14	57	-
R.I.	4	-	3	-	-	1	-	-	1	-	2	2	-	-	-
Conn.	8	-	-	-	-	8	20	-	2	-	4	6	-	-	-
MID. ATLANTIC	26	18	21	1	2	6	61	-	24	8	175	110	-	4	15
Upstate N.Y.	8	-	2	-	-	1	28	-	3	6	64	37	-	4	1
N.Y. City	1	-	1	-	-	1	-	-	-	2	34	2	-	-	7
N.J.	13	18	18	1	1	4	16	-	-	-	-	27	-	-	6
Pa.	4	U	-	U	1	-	17	U	21	U	77	44	U	-	1
E.N. CENTRAL	21	-	3	-	1	-	117	2	48	1	113	163	3	5	1
Ohio	3	-	-	-	-	-	29	-	8	-	54	67	-	-	-
Ind.	6	-	1	-	-	-	25	-	2	1	16	8	-	-	-
Ill.	3	-	-	-	-	-	37	-	22	-	11	20	-	2	-
Mich.	8	-	-	-	-	-	13	2	16	-	21	9	3	3	-
Wis.	1	-	2	-	1	-	13	-	-	-	11	59	-	-	1
W.N. CENTRAL	10	-	-	-	-	-	59	1	10	-	21	26	-	-	1
Minn.	4	-	-	-	-	-	5	-	-	-	8	-	-	-	-
Iowa	3	-	-	-	-	-	5	-	3	-	1	-	-	-	-
Mo.	2	-	-	-	-	-	33	1	6	-	5	12	-	-	1
N. Dak.	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-
S. Dak.	-	-	-	-	-	-	4	-	-	-	-	1	-	-	-
Nebr.	-	-	-	-	-	-	3	-	-	-	1	4	-	-	-
Kans.	1	-	-	-	-	-	9	-	-	-	6	8	-	-	-
S. ATLANTIC	61	1	7	-	-	13	134	2	50	9	110	47	-	5	3
Del.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Md.	27	-	-	-	-	1	10	-	8	2	35	21	-	-	1
D.C.	7	-	-	-	-	-	1	-	-	1	3	-	-	-	-
Va.	8	-	1	-	-	1	19	1	11	1	13	3	-	-	-
W. Va.	-	-	-	-	-	-	6	-	2	-	1	1	-	-	-
N.C.	1	-	-	-	-	-	25	1	17	-	31	8	-	-	-
S.C.	1	-	-	-	-	-	5	-	5	1	8	2	-	-	-
Ga.	7	-	-	-	-	-	18	-	2	-	6	8	-	-	-
Fla.	8	1	6	-	-	11	50	-	5	4	13	4	-	5	1
E.S. CENTRAL	5	1	24	-	-	-	58	-	4	-	22	30	-	-	-
Ky.	-	-	-	-	-	-	14	-	-	-	2	7	-	-	-
Tenn.	3	1	24	-	-	-	13	-	-	-	13	14	-	-	-
Ala.	1	-	-	-	-	-	25	-	-	-	7	7	-	-	-
Miss.	1	-	-	-	-	-	6	-	4	-	-	2	-	-	-
W.S. CENTRAL	6	-	5	-	1	1	99	14	70	1	25	11	4	4	8
Ark.	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-
La.	-	-	-	-	-	1	16	-	4	1	2	4	-	-	-
Okla.	1	-	-	-	-	-	8	6	20	-	20	7	4	4	1
Tex.	5	-	5	-	1	-	65	8	46	-	3	-	-	-	7
MOUNTAIN	4	3	11	-	-	2	50	-	7	5	40	42	-	-	4
Mont.	-	-	-	-	-	-	2	-	-	-	2	-	-	-	-
Idaho	2	-	1	-	-	-	10	-	3	4	20	9	-	-	1
Wyo.	-	-	-	-	-	-	2	-	-	-	-	1	-	-	-
Colo.	-	-	-	-	-	2	3	-	-	1	6	12	-	-	-
N. Mex.	1	-	-	-	-	-	4	N	N	-	3	13	-	-	-
Ariz.	-	-	-	-	-	-	17	-	-	-	6	3	-	-	-
Utah	1	3	10	-	-	-	8	-	1	-	3	4	-	-	2
Nev.	-	-	-	-	-	-	4	-	3	-	-	-	-	-	1
PACIFIC	58	-	8	-	3	14	148	1	49	1	155	92	-	7	13
Wash.	1	-	-	-	-	-	13	-	2	-	11	6	-	-	-
Oreg.	2	-	-	-	-	-	17	N	N	-	18	-	-	-	1
Calif.	46	-	8	-	3	3	113	1	42	1	122	81	-	7	7
Alaska	-	-	-	-	-	-	1	-	2	-	-	1	-	-	1
Hawaii	9	-	-	-	-	11	4	-	3	-	6	4	-	-	4
Guam	-	U	1	U	-	-	-	U	-	U	-	-	U	-	-
P.R.	-	-	5	-	-	90	2	-	2	-	-	-	-	-	-
V.I.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	1	-	-	1	-	1	2	-	-	-
C.N.M.I.	1	U	23	U	-	-	-	U	-	U	-	-	U	-	-

*For measles only, imported cases include both out-of-state and international importations.
N: Not notifiable U: Unavailable † International § Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending March 26, 1994, and March 27, 1993 (12th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-Shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1994	Cum. 1993	Cum. 1994	Cum. 1994	Cum. 1993	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994
UNITED STATES	4,338	6,505	49	3,426	3,650	2	62	22	1,181
NEW ENGLAND	46	105	1	77	37	-	8	1	388
Maine	1	2	-	-	5	-	-	-	-
N.H.	-	12	-	2	3	-	-	-	52
Vt.	-	-	-	-	-	-	-	-	36
Mass.	12	45	1	36	8	-	4	1	151
R.I.	5	2	-	8	-	-	1	-	5
Conn.	28	44	-	31	21	-	3	-	144
MID. ATLANTIC	278	534	8	489	795	-	12	-	111
Upstate N.Y.	29	61	5	47	111	-	2	-	-
N.Y. City	153	361	-	288	488	-	4	-	-
N.J.	40	74	-	106	100	-	6	-	71
Pa.	56	38	3	48	96	-	-	-	40
E.N. CENTRAL	508	1,045	17	383	448	-	10	2	2
Ohio	233	289	6	56	58	-	1	1	-
Ind.	63	91	1	30	43	-	1	-	-
Ill.	112	391	4	210	257	-	5	-	-
Mich.	73	152	6	77	73	-	3	1	-
Wis.	27	122	-	10	17	-	-	-	2
W.N. CENTRAL	270	419	7	84	66	2	-	1	31
Minn.	13	26	-	24	-	-	-	-	1
Iowa	13	25	5	7	5	-	-	1	14
Mo.	228	336	1	40	34	2	-	-	4
N. Dak.	-	-	-	1	3	-	-	-	-
S. Dak.	-	-	-	6	6	-	-	-	1
Nebr.	-	7	1	-	5	-	-	-	-
Kans.	16	25	-	6	13	-	-	-	11
S. ATLANTIC	1,343	1,743	1	573	505	-	13	15	412
Del.	6	31	-	-	9	-	-	-	4
Md.	59	95	-	56	79	-	2	-	142
D.C.	62	86	-	28	24	-	1	-	1
Va.	166	145	-	66	115	-	-	1	85
W. Va.	6	1	-	20	19	-	-	-	13
N.C.	445	456	-	75	79	-	-	7	42
S.C.	154	299	-	97	84	-	-	-	37
Ga.	216	314	-	209	156	-	-	7	80
Fla.	229	316	1	22	-	-	10	-	8
E.S. CENTRAL	928	716	1	184	247	-	-	1	34
Ky.	64	66	-	59	63	-	-	-	-
Tenn.	224	147	1	1	38	-	-	-	9
Ala.	160	195	-	94	103	-	-	-	25
Miss.	480	308	-	30	43	-	-	1	-
W.S. CENTRAL	900	1,529	-	347	285	-	2	1	132
Ark.	125	281	-	55	27	-	-	-	7
La.	478	560	-	-	-	-	1	-	14
Okla.	15	87	-	29	25	-	-	1	13
Tex.	282	601	-	263	213	-	1	-	98
MOUNTAIN	55	57	2	97	116	-	5	-	17
Mont.	-	-	-	-	-	-	-	-	-
Idaho	1	-	1	6	2	-	-	-	-
Wyo.	-	1	-	3	-	-	-	-	5
Colo.	34	20	1	1	11	-	2	-	-
N. Mex.	5	12	-	15	10	-	-	-	-
Ariz.	10	22	-	50	58	-	-	-	12
Utah	5	1	-	-	8	-	1	-	-
Nev.	-	1	-	22	27	-	2	-	-
PACIFIC	10	357	12	1,192	1,111	-	12	1	54
Wash.	7	11	-	45	47	-	1	-	-
Oreg.	2	22	-	30	13	-	-	-	-
Calif.	-	322	9	1,050	980	-	10	1	37
Alaska	-	1	-	14	8	-	-	-	17
Hawaii	1	1	3	53	63	-	1	-	-
Guam	-	-	-	7	16	-	-	-	-
P.R.	73	141	-	-	44	-	-	-	17
V.I.	4	13	-	-	2	-	-	-	-
Amer. Samoa	-	-	-	-	1	-	1	-	-
C.N.M.I.	1	-	-	13	6	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending March 26, 1994 (12th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	615	429	109	48	15	14	45
Boston, Mass.	189	116	40	23	5	5	17
Bridgeport, Conn.	42	33	5	2	2	-	2
Cambridge, Mass.	27	25	1	1	-	-	3
Fall River, Mass.	33	24	5	2	-	2	1
Hartford, Conn.	43	28	10	4	1	-	-
Lowell, Mass.	22	12	4	2	3	1	1
Lynn, Mass.	15	12	1	2	-	-	2
New Bedford, Mass.	33	30	3	-	-	-	2
New Haven, Conn.	46	30	5	5	4	2	3
Providence, R.I.	41	30	10	1	-	-	4
Somerville, Mass.	7	5	2	-	-	-	-
Springfield, Mass.	40	25	10	3	-	2	2
Waterbury, Conn.	26	18	6	1	-	1	-
Worcester, Mass.	51	41	7	2	-	1	8
MID. ATLANTIC	2,839	1,854	541	308	72	62	136
Albany, N.Y.	50	38	6	3	1	2	4
Allentown, Pa.	29	26	2	1	-	-	-
Buffalo, N.Y.	100	72	18	5	3	2	2
Camden, N.J.	27	15	7	4	1	-	2
Elizabeth, N.J.	30	18	10	1	1	-	4
Erie, Pa.§	56	43	11	1	1	-	1
Jersey City, N.J.	43	30	5	5	1	2	-
New York City, N.Y.	1,419	854	298	203	40	24	57
Newark, N.J.	72	36	17	10	1	6	3
Paterson, N.J.	36	22	9	4	1	-	-
Philadelphia, Pa.	556	390	98	43	11	14	37
Pittsburgh, Pa.§	60	43	10	4	1	2	5
Reading, Pa.	10	3	3	3	-	1	1
Rochester, N.Y.	127	86	24	12	1	4	7
Schenectady, N.Y.	30	24	6	-	-	-	-
Scranton, Pa.§	25	21	4	-	-	-	-
Syracuse, N.Y.	99	74	7	5	8	5	9
Trenton, N.J.	25	22	1	2	-	-	1
Utica, N.Y.	11	8	2	1	-	-	1
Yonkers, N.Y.	34	29	3	1	1	-	2
E.N. CENTRAL	2,146	1,369	392	202	77	106	137
Akron, Ohio	63	50	6	3	4	-	-
Canton, Ohio	41	30	7	2	1	1	4
Chicago, Ill.	310	119	50	61	31	49	27
Cincinnati, Ohio	142	94	28	12	3	5	19
Cleveland, Ohio	167	113	28	12	5	9	5
Columbus, Ohio	210	142	44	12	5	7	13
Dayton, Ohio	107	82	17	7	1	-	7
Detroit, Mich.	251	151	56	31	4	9	5
Evansville, Ind.	56	38	12	3	2	1	3
Fort Wayne, Ind.	59	40	15	2	2	-	3
Gary, Ind.	22	8	5	6	1	2	-
Grand Rapids, Mich.	37	23	7	3	2	2	4
Indianapolis, Ind.	100	89	41	19	4	7	8
Madison, Wis.	63	43	13	2	2	3	7
Milwaukee, Wis.	126	98	19	6	1	2	13
Peoria, Ill.	45	34	5	4	2	-	3
Rockford, Ill.	58	40	11	4	1	2	4
South Bend, Ind.	46	30	8	3	1	4	8
Toledo, Ohio	108	83	11	7	4	3	3
Youngstown, Ohio	75	62	9	3	1	-	1
W.N. CENTRAL	650	448	105	61	20	15	32
Des Moines, Iowa	22	15	3	3	-	1	2
Duluth, Minn.	18	15	2	1	-	-	6
Kansas City, Kans.	20	12	3	4	-	-	1
Kansas City, Mo.	115	78	23	12	1	1	2
Lincoln, Nebr.	18	13	2	3	-	-	-
Minneapolis, Minn.	155	119	19	12	4	1	7
Omaha, Nebr.	75	52	13	4	4	2	5
St. Louis, Mo.	130	89	16	14	5	6	5
St. Paul, Minn.	37	25	9	1	1	1	2
Wichita, Kans.	60	30	15	7	5	3	2
S. ATLANTIC	1,356	814	286	159	64	32	92
Atlanta, Ga.	212	121	46	27	7	11	6
Baltimore, Md.	172	111	32	17	10	2	13
Charlotte, N.C.	94	62	20	11	1	-	8
Jacksonville, Fla.	112	74	30	4	3	1	7
Miami, Fla.	109	63	24	10	11	1	-
Norfolk, Va.	44	25	7	6	2	3	5
Richmond, Va.	95	36	25	24	9	1	12
Savannah, Ga.	47	27	8	8	1	3	5
St. Petersburg, Fla.	71	56	7	4	2	2	6
Tampa, Fla.	186	116	32	24	12	2	23
Washington, D.C.	196	106	55	23	6	6	7
Wilmington, Del.	18	17	-	1	-	-	-
E.S. CENTRAL	854	550	198	65	25	16	71
Birmingham, Ala.	135	80	31	16	5	3	7
Chattanooga, Tenn.	73	53	16	2	2	-	5
Knoxville, Tenn.	93	64	24	3	-	2	12
Lexington, Ky.	78	51	20	3	4	-	5
Memphis, Tenn.	178	112	42	14	6	4	15
Mobile, Ala.	122	73	33	10	3	3	8
Montgomery, Ala.	40	28	7	4	1	-	-
Nashville, Tenn.	135	89	25	13	4	4	19
W.S. CENTRAL	1,594	1,015	312	161	54	48	94
Austin, Tex.	92	58	16	14	2	2	7
Baton Rouge, La.	75	60	7	3	3	2	4
Corpus Christi, Tex.	48	36	9	1	1	1	1
Dallas, Tex.	198	123	38	24	8	5	3
El Paso, Tex.	76	51	15	7	1	2	3
Ft. Worth, Tex.	136	87	24	14	3	8	3
Houston, Tex.	372	209	97	44	11	11	45
Little Rock, Ark.	88	50	18	11	5	4	3
New Orleans, La.	120	66	17	17	8	6	-
San Antonio, Tex.	173	122	25	15	8	3	11
Shreveport, La.	112	82	21	4	3	2	11
Tulsa, Okla.	104	71	25	7	1	-	3
MOUNTAIN	828	568	153	61	18	28	64
Albuquerque, N.M.	74	48	12	9	3	2	2
Colo. Springs, Colo.	45	30	9	3	-	3	5
Denver, Colo.	99	68	15	8	-	8	9
Las Vegas, Nev.	127	89	29	5	2	2	9
Ogden, Utah	19	16	3	-	-	-	2
Phoenix, Ariz.	184	120	31	19	8	6	17
Pueblo, Colo.	31	23	7	1	-	-	1
Salt Lake City, Utah	92	61	15	9	2	5	9
Tucson, Ariz.	157	113	32	7	3	2	10
PACIFIC	1,872	1,283	295	212	48	30	121
Berkeley, Calif.	19	13	3	2	-	1	3
Fresno, Calif.	59	31	16	5	3	4	5
Glendale, Calif.	34	30	2	2	-	-	1
Honolulu, Hawaii	73	44	20	6	3	-	4
Long Beach, Calif.	96	72	9	10	2	3	16
Los Angeles, Calif.	573	381	89	74	17	6	27
Pasadena, Calif.	31	23	7	1	-	-	2
Portland, Oreg.	147	108	21	15	-	3	2
Sacramento, Calif.	U	U	U	U	U	U	U
San Diego, Calif.	148	98	26	21	2	1	12
San Francisco, Calif.	163	101	21	34	3	4	6
San Jose, Calif.	178	128	28	14	4	4	17
Santa Cruz, Calif.	36	29	2	3	2	-	3
Seattle, Wash.	156	101	26	17	8	4	7
Spokane, Wash.	58	45	9	3	1	-	4
Tacoma, Wash.	101	79	16	5	1	-	12
TOTAL	12,754¶	8,330	2,391	1,277	391	349	792

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

†Pneumonia and influenza.

§Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

¶Total includes unknown ages.

U: Unavailable.

Streptococcus pneumoniae — *Continued*

cephalosporin should be considered for cases of life-threatening infection (e.g., meningitis) potentially caused by *S. pneumoniae* until results of culture and susceptibility testing are known. The emergence of drug-resistant pneumococcal infections underscores the need for adherence to recommendations of the Advisory Committee on Immunization Practices that persons aged ≥2 years with medical conditions placing them at increased risk for serious pneumococcal infection and all persons aged ≥65 years should receive 23-valent pneumococcal capsular polysaccharide vaccine (*10*); no pneumococcal vaccine is licensed for children aged <2 years.

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International Notes

Progress Toward Poliomyelitis Eradication — Egypt, 1993

Since 1990, the Ministry of Health in Egypt has directed efforts toward achieving poliomyelitis eradication by the end of 1994. To achieve this goal, the Egyptian Expanded Program on Immunization (EPI) has progressively implemented each of four World Health Organization (WHO)-recommended strategies: 1) increasing and sustaining routine coverage with oral poliovirus vaccine (OPV); 2) conducting National Immunization Days (NIDs); 3) developing surveillance for acute flaccid paralysis (AFP),

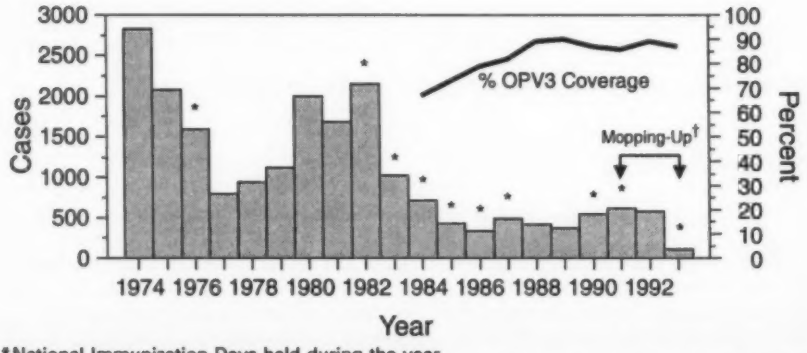
Poliomyelitis — Continued

including laboratory confirmation of cases; and 4) instituting "mopping-up" vaccination (i.e., house-to-house administration of two doses of OPV at an interval of 4–6 weeks to all children aged <3 years who reside in areas where risk for wild poliovirus transmission is highest). This report summarizes the poliomyelitis eradication effort in Egypt based on a program review conducted during November 20–30, 1993, by the Egyptian Ministry of Health; Cairo University; the High Institute for Public Health in Alexandria, Egypt; WHO; Rotary International; and CDC.

Routine vaccination coverage with all EPI target disease vaccines (bacille Calmette-Guérin [BCG], diphtheria and tetanus toxoids and pertussis vaccine [DTP], measles, and OPV) increased substantially following the acceleration of activities in 1984, and coverage has remained high. The routine OPV vaccination schedule consists of doses at ages 2, 4, 6, 9, and 18 months. Reported vaccination coverage with three doses of OPV in children aged <1 year increased from 67% in 1984 to 90% in 1989 and has ranged from 87% to 89% during 1990–1993 (Figure 1). From 1984 to 1990, routine vaccination coverage with the other EPI target disease vaccines also increased (BCG: 53% to 89%; three doses of DTP: 57% to 87%; and measles vaccine: 41% to 87%), and since 1990, coverage with these vaccines has remained high.

In addition to the routine vaccination program, supplemental vaccination activities have been used to achieve poliomyelitis eradication goals. NIDs have been conducted intermittently since 1976, and the level of activity increased from 1990–1991, when a single dose of OPV was administered annually to approximately 8.5–8.7 million children aged <5 years, to January–February 1993, when 17 million doses were administered in two separate rounds to approximately 8.4–8.6 million children (Figure 1). Mopping-up vaccination activities also have been used since 1991 (Figure 1). High-risk districts are designated on the basis of low vaccination coverage and confirmed poliomyelitis cases during the preceding 5 years. During 1991–1992, 6 million

FIGURE 1. Number of poliomyelitis cases, 1974–1993, and percentage of children who received three doses of oral poliovirus vaccine (OPV3), 1984–1993 — Egypt



*National Immunization Days held during the year.
†House-to-house administration of two doses of oral poliovirus vaccine at an interval of 4–6 weeks to all children aged <3 years who reside in areas where risk for wild poliovirus transmission is highest.

Poliomyelitis — Continued

doses of OPV were administered during more than 100 districtwide mopping-up operations.

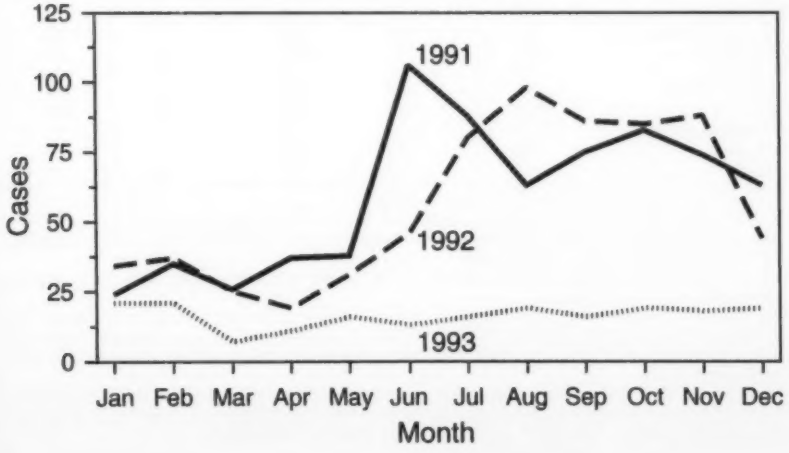
AFP surveillance was initiated in August 1990, and a policy of regular zero reporting (i.e., reporting even if no cases occurred) from all reporting sites was instituted in January 1992. In April 1992, AFP case investigation was intensified with emphasis on proper collection of two stool specimens for virus isolation. Despite increased surveillance, the reported number of cases of confirmed poliomyelitis decreased from 619 cases in 1991 to 115 cases in 1993 (Figures 1 and 2). In 1993, the seasonal variation in AFP incidence, which reflects the occurrence of poliomyelitis and usually peaks in Egypt during August–October, decreased substantially (Figure 2).

The geographic distribution of confirmed poliomyelitis cases remained widespread in 1992, with cases reported from 24 of 26 governorates. However, during 1993, poliomyelitis was focally distributed and reported in 17 of 26 governorates.

Reported by: Expanded Program on Immunization, Ministry of Health, Cairo. Eastern Mediterranean Regional Office, World Health Organization, Alexandria, Egypt; Expanded Program on Immunization, World Health Organization, Geneva. International Health Program Office; Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases; Polio Eradication Activity, National Immunization Program, CDC.

Editorial Note: Because of its location between the emerging poliomyelitis-free zones of the Mahgreb Union and Arab states of the Persian Gulf, Egypt is particularly important to the goal of global eradication of poliomyelitis by the year 2000 (*1*). As a result of the implementation of large-scale supplementary vaccination activities and efforts to strengthen the poliomyelitis disease surveillance system, Egypt has made substantial progress toward eradicating poliomyelitis by the end of 1994. The incidence of poliomyelitis has decreased despite improvements in the poliomyelitis surveillance system. In addition, supplemental vaccination activities with OPV have not adversely affected the routine vaccination program or coverage levels with vaccines for the

FIGURE 2. Number of acute flaccid paralysis cases, by month — Egypt, 1991–1993



Poliomyelitis — Continued

other EPI target diseases (i.e., diphtheria, measles, pertussis, tetanus, and tuberculosis).

Since 1991, the epidemiologic pattern of poliomyelitis in Egypt has changed from widespread endemic disease to a problem of more limited focal distribution. This change may be attributed to the combination of NIDs and focused mopping-up vaccination in high-risk districts. The Ministry of Health in Egypt plans to continue two rounds of NIDs each in 1994 and 1995 to ensure interruption of transmission of wild poliovirus. Decisions to conduct additional NIDs will be made following reassessment of the epidemiologic situation during 1995.

Reference

1. World Health Assembly. Global eradication of poliomyelitis by the year 2000. Geneva: World Health Organization, 1988. (Resolution WHA41.28).

Monthly Immunization Table

To track progress toward achieving the goals of the Childhood Immunization Initiative (CII), CDC publishes monthly a tabular summary of the number of cases of all diseases preventable by routine childhood vaccination reported during the previous month and year-to-date (provisional data). In addition, the table compares provisional data with final data for the previous year and highlights the number of reported cases among children aged ≤5 years, who are the primary focus of CII. Data in the table are derived from CDC's National Notifiable Diseases Surveillance System.

Number of reported cases of diseases preventable by routine childhood vaccination — United States, February 1994 and 1993–1994*

Disease	No. cases, February 1994	Total cases		No. cases among children aged <5 years†	
		1993	1994	1993	1994
Congenital rubella syndrome (CRS)	2	2	2	1	2
Diphtheria	0	0	0	0	0
Haemophilus influenzae§	91	200	168	71	50
Hepatitis B¶	883	1636	1540	12	33
Measles	28	52	34	22	7
Mumps	111	239	179	53	20
Pertussis	299	472	513	255	308
Poliomyelitis, paralytic**	—	—	—	—	—
Rubella	34	21	37	7	4
Tetanus	2	2	3	0	0

*Data for 1993 are final and for 1994, provisional.

†For 1993 and 1994, age data were available for 85% or more cases, except for 1993 CRS, which were available for 50% of cases, and 1994 pertussis and tetanus, which were available for 84% and 67% of cases, respectively.

§Invasive disease; *H. influenzae* serotype is not routinely reported to the National Notifiable Diseases Surveillance System.

¶Because most hepatitis B virus infections among infants and children aged <5 years are asymptomatic (although likely to become chronic), acute disease surveillance does not reflect the incidence of this problem in this age group or the effectiveness of hepatitis B vaccination in infants.

**No cases of suspected poliomyelitis have been reported in 1994; three cases of suspected poliomyelitis have been reported in 1993; four of the five suspected cases with onset in 1992 were confirmed; the confirmed cases were vaccine associated.

MMWR

Walter R. Dowdle, Ph.D., In Honor of 33 Years' Service at CDC

On April 1, 1994, Walter R. Dowdle, Ph.D., retired from CDC following 33 years of distinguished service in the U.S. Public Health Service. Since 1987, Dr. Dowdle has been Deputy Director of CDC and has had major responsibility within CDC's Office of the Director for providing oversight to the *Morbidity and Mortality Weekly Report* (*MMWR*) series. His high standard of excellence has helped to ensure the quality, integrity, and most effective application of scientific information published on behalf of the public. CDC and the Public Health Service are indebted to Dr. Dowdle for his dedication and commitment to public health.

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